Abstract

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Title of Diploma thesis: *Synthesis of ceramide analogues based on 5C sphingosine*

Ceramides are lipids, in particular sphingolipids. They have many important roles in the organism. Ceramides form the main part of lipid matrix in the stratum corneum, the uppermost skin layer, and take an important part in maintaining skin barrier properties. Membranes of eukaryotic cells also contain ceramides, and both ceramides and their derivatives formed in organism are important signalling molecules. They act as both primary and secondary messengers, participating in regulation of cell growth, apoptosis and inflammatory responses.

Although ceramides have been investigated for a long time, there are still many unanswered questions. Fo rthe understanding of the ceramide functions, it is necessary to investigate their movement in the organism and study the effects of their analogs with changed structure. Olefin metathesis is often used for synthesis of analogs with varying chain length or different florescent labels.

This thesis describes attempts to synthesise ceramide analogs with very short sphingosine chain, which can be used as suitable intermediates for the synthesis by olefin metathesis of series of ceramide anaolgs with different chain lengths.

L-serine was chosen as a starting material, and the first important intermediate was Garner´s aldehyde. Next, two different approaches for the synthesis of 5C sphingosine from Garner´s aldehyde were studied. Lastly, several approaches for the synthesis of ceramide analog were attempted, but allmost all were unsuccessfull. Only one ceramide analog was synthesised.

Because of these results, another synthetic approach towards the ceramide analogs will be necessary in future.